

I. REJECTION OF CLAIMS 4 AND 6-8 UNDER 35 USC §112, 2nd ¶

Claims 4 and 6-8 stand rejected under 35 USC §112, second paragraph, as being indefinite. Withdrawal of the rejection is respectfully requested for at least the following reasons.

Regarding claims 4, 6 and 7, the claims have been amended so as not to refer to "preferable" configurations. New claim 14 has been added to address the subject matter deleted from claim 7. Claim 8 has been canceled.

Accordingly, all the claims should now be definite. Withdrawal of the rejection is respectfully requested.

II. REJECTION OF CLAIMS 1, 3-5 AND 8 UNDER 35 USC §102(b)

Claims 1, 3-5 and 8 stand rejected under 35 USC §102(b) based on *Arakawa et al.* Withdrawal of the rejection is respectfully requested for at least the following reasons.

Claim 1 has been amended herein to emphasize the feature that the active region includes a ridge waveguide with dimensionally unconstricted end sections. An object of the present invention is to keep the structure of the resulting waveguide diode as simple as possible and the additional components to a minimum. Thus, any alteration of the physical dimensions of the laser's waveguide at its front and/or back end was unacceptable because such alteration requires additional steps for removing, e.g., etching, structural parts of the waveguide.

Arakawa et al. describes a laser diode with one (or two) dimensionally constricted or tapered or significantly altered end sections. Needless to say, these constrictions or alterations require significant additional manufacturing steps. As stated above, this is just what the present invention seeks to avoid.¹

¹Fig. 10 of *Arakawa et al.* shows a "conventional" laser. This laser, described as prior art, does not have a tapered or constricted end section. The present invention, however, is applicable to such a structure. Thus, the present invention cannot be anticipated nor obviated by *Arakawa et al.* whose purported inventiveness just lies in significantly altering, i.e., tapering, the structure of the laser's end sections.

Furthermore, any dimensional restriction in the laser facet region as proposed by *Arakawa et al.* has a further downside, in particular regarding the front end section: The resulting higher energy density in the laser's end section may well lead to an even earlier failure because of overheating - which is one of the problems the present invention seeks to overcome.

Also, any structural or dimensional constriction as proposed by *Arakawa et al.* affects the laser's farfield, often in an unwanted and detrimental way. Again, the present invention, since it includes a ridge waveguide with dimensionally unconstricted end sections as recited in amended claim 1, has no effect on the laser's farfield.

For at least the above reasons, *Arakawa et al.* does not teach or suggest the invention as recited in amended claim 1. Claims 3-5 can be distinguished for at least the same reasons. Thus, withdrawal of the rejection is respectfully requested.

III. REJECTION OF CLAIMS 1 AND 3-5 UNDER 35 USC §102(b)

Claims 1 and 3-5 stand rejected under 35 USC §102(b) based on *Mitsui et al.* Withdrawal of this rejection is respectfully requested for at least the following reasons.

Mitsui et al., like *Arakawa et al.*, describes a laser diode with one (or two) dimensionally constricted or tapered or significantly altered end sections. As previously noted, these constrictions or alterations require significant additional manufacturing steps. Moreover, such constrictions or alterations can lead to even earlier failure due to overheating, which the present invention seeks to avoid. Also, such constrictions or alterations can detrimentally affect the laser's farfield as described above.

Mitsui et al. shows a constriction of the laser's end sections. Here, the waveguide has the form of a shortened "mesa" on a longer substrate. The step formed by the mesa, i.e., the lowered part is filled with a current blocking layer. The complication of building a short waveguide mesa on a longer substrate is just what the present invention wants to avoid since it is significantly more complex and expensive than using simple and straightforward "conventional" waveguide.

Claim 1, as amended, emphasizes how the laser of the does not have a dimensional constriction as found in *Mitsui et al.* *Mitsui et al.* emphasizes using

dimensional constrictions such as the mesas. Thus, *Mitsui et al.* does not teach or suggest a laser diode as recited in claims 1 and 3-5. Withdrawal of the rejection is respectfully requested.

IV. REJECTION OF CLAIMS 1 AND 2 UNDER 35 USC §102(b)

Claims 1 and 2 stand rejected under 35 USC §102(b) based on *Gfeller et al.* Withdrawal of this rejection is respectfully requested for at least the following reasons.

Gfeller et al. describes a somewhat different design, namely a laser with a so called bent-waveguide structure. Again, the focus of the *Gfeller et al.* invention lies in improving the facet behavior - not the reduction of the injection current in the end section(s). Further, to build a bent waveguide is far away and much more complicated than using simple and straightforward "conventional" waveguide as does the present invention. Thus, the bent waveguide does not anticipate nor obviate the dimensionally unconstricted waveguide as recited in amended claim 1.

Withdrawal of the rejection is respectfully requested.

V. REJECTION OF CLAIMS 6-7 AND 9-10 UNDER 35 USC §103(a)

Claims 6-7 and 9-10 stand rejected under 35 USC §103(a) based on *Arakawa et al.* Withdrawal of this rejection is respectfully requested for at least the following reasons.

Claims 6-7 and 9-10 each depend from claim 1 either directly or indirectly. Accordingly, these claims can be distinguished over the teachings of *Arakawa et al.* for at least the same reasons stated above, as well as based on the particular recitations therein.

VI. CONCLUSION


Accordingly, all claims are believed to be allowable and the application is believed to be in condition for allowance. A prompt action to such end is earnestly solicited.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should a petition for an extension of time be necessary for the timely reply to the outstanding Office Action (or if such a petition has been made and an additional extension is necessary), petition is hereby made and the Commissioner is authorized to charge any fees (including additional claim fees) to Deposit Account No. 18-0988.

Respectfully submitted,

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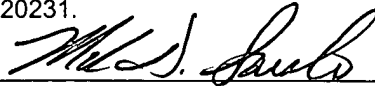
DATE: April 16, 2003

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April 16, 2003

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